

# PSYCHE.

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## Odoriferous Glands in Phasmidae.

Specimens of *Anisomorpha*, probably *A. buprestoides* Stoll', were recently sent me from Texas by Mr. J. Boll, with the statement that when the females were captured they spurted from the prothorax, somewhat after the manner of bombardier beetles, a strong vapor, which slightly burnt the skin; when the females were seized by the males, a thick fluid oozed from the same spot. Say gave a similar account in his *American Entomology*, nearly fifty years ago, on the authority of Mr. Peale, who told him that specimens of *A. buprestoides*, when taken, discharge "a milky white fluid from two pores of the thorax, diffusing a strong odor, in a great measure like that of the common *Gnaphalium* or *Life Everlasting*"; a plant, he adds, "growing near the place where they occurred." Another instance is recorded by Bates, who named a S. American species *Phasma putidum*, because, when it is seized, "a dark liquor oozes from the mouth and other parts of the body, emitting a most peculiar and disagreeable odor."

Mr. Boll attributes this power to the females only, but both sexes certainly possess, with equal distinctness, the pores through which the fluid or vapor passes. These are situated one on each side of the prothorax at its upper anterior extremity, at the bottom of a large and deep pit, opening outward and a little forward, its upper and posterior borders with abrupt sides. These pores, or foramina repugnatoria, as they may be called from their analogy with the pores in *Myriapods*, so named by Waga, greatly resemble stigmata, and have actually been mistaken for a prothoracic pair by Stål,<sup>1</sup> and are de-

<sup>1</sup> *Recensio Orthopterorum*, III, 54-55, § 156-157.

scribed by him as present in the whole group of genera allied to *Phasma* (s. str.). They are very conspicuous in *Autolyca pallidicornis* Stål, and doubtless all the species possessing the foramina are endowed with this peculiar means of defense, the only one known to Phasmidae, apart from their mimetic deceits. It may be questioned, indeed, whether the foramina are not common to the entire family, for they occur also in *Phyllium* and *Heteropteryx* and all other genera I have examined, even in those not appertaining to the groups in which they are mentioned by Stål. In *Heteropteryx* they are conspicuous and are situated at the outer anterior base of a large pointed spine, in the same relative position as in the genera already mentioned.

The occurrence of foramina repugnatoria presupposes, of course, some tegumentary follicles or deeper seated glands for the secretion of the offensive fluid, and since the existence of glands of any considerable size, opening upon the sides of the body, is quite unknown in the true insects, as far as I am aware (with the exception of such extensible structures as the caruncles of *Malachius* and allies), it is additionally interesting to observe that these foramina are the openings of true glandulæ odoriferae, which, in certain species, attain a very great size. If an *Autolyca pallidicornis*, for instance, be opened upon the dorsal surface,<sup>1</sup> these glands will be seen at first glance lying side by side above the salivary glands,—two straight, flattened, ribbon-like bodies, blind sacs with stout walls, each one and a half millimetres broad, extending from the posterior extremity of the mesothorax, where they are broadly rounded, to the anterior part of the prothorax; here they are curved slightly outward toward the foramina and taper rapidly, changing at the same time from a flattened to a cylindrical, and finally to a compressed form, so as to have the appearance of being twisted through quarter of a circle. The membrane at the base of the pit in which the foramina are situated is very delicate, excepting near the centre, where it is thickened; in the middle of the thickened portion occurs a nearly perpendicular slit, less than 0.25 mm. long, which may probably be opened or closed at will by the action of muscles on its thickened walls. In *Aniso-*

<sup>1</sup>All my observations are taken from specimens preserved in alcohol.

*morpha buprestoides* the glands have the same appearance, and though comparatively slenderer, reach likewise the extremity of the mesothorax.

My examination of these genera, in which the odoriferous glands prove so conspicuous, made it seem very remarkable that they had hitherto been overlooked in Phasmidae; for although the anatomical researches of Müller and Brandt upon *Bacteria ferula* (Fabr.) had reference principally to certain features of the nervous system, yet the former at least touches upon other parts of its structure, and even gives a detailed drawing of the alimentary canal, the anterior part of which, with its salivary glands, would have been quite concealed by the odoriferous glands, were they as conspicuous in that species as in those above mentioned. In such a case Müller could not have overlooked them. Leidy, too, in his account of the anatomy of *Diapheromera femorata* (Say), makes no mention whatever of parts such as are described above, or, indeed, of any special glands. An examination of the latter species, however, in which the foramina are very minute, shows that the glandulæ odoriferæ are present, although they are inconspicuous and do not occupy the position along the dorsum in which they are found in *Autolyca* and *Anisomorpha*. They consist of a pair of small obovate or subfusiform sacs, one on each side of the prothorax, about a millimetre in length, and half a millimetre in width, with a short and very slender duct opening exteriorly, as in the other genera; these sacs are directed inward and a little downward, and scarcely reach the œsophagus at all. Should a similar feature hold in *Bacteria ferula*, as is probable from the relationship of the two insects, we need not be surprised to find it overlooked in the dissection of an alcoholic specimen, such as Müller must have had, especially when the object of his investigation was to trace a portion of the nervous system.

Should foramina repugnatoria, with odoriferous glands, be found in all Phasmidae, it might at first be thought probable that they would also be discovered in other Orthoptera. It should, however, be remembered that all the other groups possess already means of active defense. Thus the saltatorial families have the power of leaping to great distances by means

of their thickened hind legs, the Blattariae and Forficulariae run with great rapidity, and the Mantidae, by their threatening attitude and well-armed fore legs, assume even the offensive; while the Phasmidae, with their slender form and sluggish movements, have special need of such a weapon as these glands furnish them.

Samuel H. Scudder.

## BIBLIOGRAPHICAL RECORD.

Authors and Societies are requested to forward their works to the Editor at the earliest date possible. We ask our readers to inform us of the publication especially of those works which are not generally consulted by entomologists.

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(Continued from page 136.)

\* 368. **S. H. Scudder.** The Distribution of Insects in New Hampshire. — A Chapter [xii] from the First Volume of the Final Report upon the Geology of New Hampshire. — Concord, N. H., 1874. large 8vo. p. 331–384, fig. 46–59, with three plates (A, B, C).

I. General Considerations [determination and characterization of the faunal areas existing in New Hampshire, with faunal charts; comparison of these with corresponding European faunal areas]. II. List of the Butterflies of New Hampshire, with Notes on their Geographical Distribution [enumerates 85 species, and gives 13 figures of 7 species; description (by A. S. Packard, Jr.) and figures of *Eulophus semideae* and *Encyrtus Montinus* = 2 n. spp. of Chalcididae parasitic in pupæ of *Oeneis semideae*]. III. List of the Orthoptera of New Hampshire, with Notes on their Geographical Distribution and Stridulation [enumerates 46 species; gives 4 figures of 3 species, and notation of 12 songs of 9 species]. Index.

The **Revue et Magasin de Zoologie**, sér. 3, T. i (1873), contains Nos. 369 to 371.

\* 369. **AUG. SALLE.** Description et Figure de Cinq Espèces de Coléoptères Mexicains. p. 11–17, pl. 9, 10.

Describes and figures *Syntelia Westwoodi*, *Macropnus Mnischechi*, *Calais Nietoi*, *Eudactylus Boucardi* = 4 n. spp.; re-describes and figures *Syntelia mexicana*; note upon *Iphis* [*Calais*] *glauca*.

\* 370. **F. E. GUERIN-MENEVILLE.** [Comptes Rendus de l'] Académie des Sciences de Paris. pp. i–xi, xxxviii–lvii, lxxvii–lxxxii.

a. Notes on *Phylloxera vastatrix* [on the identity of the American leaf insect with the European root insect; why then are leaf-galls so rare on our vines?; on an *Acarus* which attacks the *Phylloxera* (by Max Cornu and Planchon)], pp. li, lxvii–lxx. b. On the Cucuyos [*Pyrophorus noctilu-*